

# **Fishery Management Report 14-53**

---

---

## **2015 Report to the Alaska Board of Fisheries: Southeast Alaska–Yakutat Herring Fisheries**

by

**Kyle Hebert**

---

---

December 2014

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



## Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the *Système International d'Unités* (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

<b>Weights and measures (metric)</b>		<b>General</b>		<b>Mathematics, statistics</b>	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	$H_A$
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	$e$
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, $\chi^2$ , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient	
milliliter	mL	west	W	(multiple)	R
millimeter	mm	copyright	©	correlation coefficient (simple)	r
		corporate suffixes:		covariance	cov
<b>Weights and measures (English)</b>		Company	Co.	degree (angular)	$^\circ$
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	degrees of freedom	df
foot	ft	Incorporated	Inc.	expected value	$E$
gallon	gal	Limited	Ltd.	greater than	>
inch	in	District of Columbia	D.C.	greater than or equal to	$\geq$
mile	mi	et alii (and others)	et al.	harvest per unit effort	HPUE
nautical mile	nmi	et cetera (and so forth)	etc.	less than	<
ounce	oz	exempli gratia	e.g.	less than or equal to	$\leq$
pound	lb	(for example)		logarithm (natural)	ln
quart	qt	Federal Information Code	FIC	logarithm (base 10)	log
yard	yd	id est (that is)	i.e.	logarithm (specify base)	log <sub>2</sub> , etc.
		latitude or longitude	lat or long	minute (angular)	'
<b>Time and temperature</b>		monetary symbols (U.S.)	\$, ¢	not significant	NS
day	d	months (tables and figures): first three letters	Jan, ..., Dec	null hypothesis	$H_0$
degrees Celsius	°C	registered trademark	®	percent	%
degrees Fahrenheit	°F	trademark	™	probability	P
degrees kelvin	K	United States (adjective)	U.S.	probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
hour	h	United States of America (noun)	USA	probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
minute	min	U.S.C.	United States Code	second (angular)	"
second	s	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard deviation	SD
<b>Physics and chemistry</b>				standard error	SE
all atomic symbols				variance	
alternating current	AC			population sample	Var
ampere	A			sample	var
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

***FISHERY MANAGEMENT REPORT NO. 14-53***

**2015 REPORT TO THE ALASKA BOARD OF FISHERIES:  
SOUTHEAST ALASKA–YAKUTAT HERRING FISHERIES**

By  
Kyle Hebert

Alaska Department of Fish and Game, Division of Commercial Fisheries, Douglas

Alaska Department of Fish and Game  
Division of Sport Fish, Research and Technical Services  
333 Raspberry Road, Anchorage, Alaska, 99518-1599

December 2014

The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: <http://www.adfg.alaska.gov/sf/publications/>. This publication has undergone regional peer review.

*Kyle Hebert,  
Alaska Department of Fish and Game, Division of Commercial Fisheries,  
802 3<sup>rd</sup> Street, Douglas, Alaska, 99824, USA*

*This document should be cited as:*

*Hebert, K. 2014. 2015 Report to the Alaska Board of Fisheries: Southeast Alaska–Yakutat herring fisheries. Alaska Department of Fish and Game, Fishery Management Report No. 14-53, Anchorage.*

The Alaska Department of Fish and Game (ADF&G) administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act (ADA) of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

**If you believe you have been discriminated against in any program, activity, or facility please write:**

ADF&G ADA Coordinator, P.O. Box 115526, Juneau, AK 99811-5526

U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MS 2042, Arlington, VA 22203

Office of Equal Opportunity, U.S. Department of the Interior, 1849 C Street NW MS 5230, Washington DC 20240

**The department's ADA Coordinator can be reached via phone at the following numbers:**

(VOICE) 907-465-6077, (Statewide Telecommunication Device for the Deaf) 1-800-478-3648,

(Juneau TDD) 907-465-3646, or (FAX) 907-465-6078

**For information on alternative formats and questions on this publication, please contact:**

ADF&G Division of Sport Fish, Research and Technical Services, 333 Raspberry Road, Anchorage AK 99518 (907) 267-2375

# TABLE OF CONTENTS

	<b>Page</b>
LIST OF TABLES.....	ii
LIST OF FIGURES.....	ii
ABSTRACT .....	1
INTRODUCTION.....	1
History of the Herring Fishery.....	1
Management Strategy .....	2
2013/14 SEASON SUMMARY .....	4
2013/14 Winter Food and Bait Fishery.....	4
2013/14 Test Fisheries .....	5
2013/14 Sac Roe Fishery .....	5
2013/14 Herring Pound Fisheries .....	5
Herring Spawn-On-Kelp Subsistence Fishery .....	6
HISTORICAL VALUE.....	7
2014/15 SEASON OUTLOOK .....	7
TABLES AND FIGURES.....	9

## LIST OF TABLES

<b>Table</b>	<b>Page</b>
1. Southeast Alaska herring harvests in tons, 1900/01 to 2013/14.....	10
2. Southeast Alaska annual herring catch by fishery, 1960/61 through 2013/14 seasons..	11
3. Herring spawning threshold levels for major herring aggregates in Southeast Alaska and Yakutat.....	13
4. Southeast Alaska winter food and bait herring harvest in tons, by fishing area and season, 1982/83 through 2013/14.....	14
5. Annual Southeast Alaska sac roe herring harvest by area, in tons, 1971 through 2013–14.....	16
6. Fresh herring bait pound harvests in tons by area, 1982-83 through 2013-14.....	18
7. Herring spawn-on-kelp pound fishery in tons of SOK product, 1989-90 through 2013-14.....	19
8. Herring spawn-on-kelp subsistence estimated harvest, 1965 through 2014.....	20
9. Southeast Alaska commercial herring fisheries total gross earnings, 1977 through 2013, by calendar year.....	22

## LIST OF FIGURES

<b>Figure</b>	<b>Page</b>
1. Southeast Alaska Region herring registration areas and management area boundaries.....	23
2. Generalized harvest strategy for Southeast Alaska and Yakutat herring showing allowable percent annual exploitation rate as related to estimated biomass of mature herring, expressed as a multiple of the threshold level.....	24
3. Food and bait fishing areas and guideline harvest levels, 2014/15 season.....	25
4. Sac-roe fishing areas and guideline harvest levels, 2014/15 season.....	26
5. Fresh bait pound fishing areas and GHs for the 2014–15 season.....	27
6. Major Southeast Alaska spawn-on-kelp subsistence fishery areas.....	28
7. Spawn-on-kelp fishing areas and guideline harvest levels, 2014/15 season.....	29

## **ABSTRACT**

Herring in Southeast Alaska and Yakutat are harvested for commercial bait, commercial sac roe, commercial spawn-on-kelp, subsistence spawn-on-kelp, and personal use fisheries and Alaska Department of Fish and Game test fisheries. Prior to 1967, a reduction fishery accounted for most of the harvest with a historic high of 78,749 tons during the 1929/30 season. A winter bait fishery has generally occurred every year since the turn of the century. The sac roe fisheries became the dominant fishery beginning in 1971. A wild spawn-on-kelp fishery occurred between 1963 and 1969, with a closed pound fishery authorized by the Board of Fisheries beginning in 1990. During the 2013/14 season, the total regional commercial harvest of herring, including estimates of herring used for commercial spawn on kelp, was over 23,345 tons. The sac roe harvest totaled 17,379 tons. The commercial harvest of spawn on kelp product was 472 tons, resulting in an estimated 5,900 tons of herring caught for supplying pounds. Although there was commercial harvest in the winter bait fishery, it is confidential because there were fewer than three participants. Test fisheries accounted for approximately 66 tons of herring. No herring fishery occurred in Yakutat.

Keywords: commercial herring harvest, 2013/14 herring season, commercial bait, commercial sac roe, commercial spawn-on-kelp, subsistence, personal use fisheries, Southeast Alaska, Yakutat.

## **INTRODUCTION**

This report summarizes historical harvests and management actions for commercial herring fisheries in Southeast Alaska and Yakutat (Region I) through the 2013/14 season with an outlook for the 2014/15 season. The Southeast Alaska Region is a composite of two Registration Areas. Area A, the Southeast Alaska area, encompasses the waters south of Cape Fairweather and north of the International Boundary at Dixon Entrance. Area D, the Yakutat area, extends west from Cape Fairweather to Cape Suckling (Figure 1). Commercial winter bait, sac roe, spawn-on-kelp, and bait pound fisheries occur in only the Southeast Alaska area. Only a winter bait season is provided by regulation in the Yakutat area. Subsistence and personal use harvesting of herring and spawn on kelp occurs in both areas.

## **HISTORY OF THE HERRING FISHERY**

Pacific herring spawning aggregates are found throughout Southeast Alaska. Spawning aggregates vary greatly in size and productivity. In general, herring that spawn on the outer-coastal areas are more productive than those that spawn in the inside waters. Southeast Alaska herring have been commercially harvested since a salting operation was initiated in the 1880s. From the 1890s to the mid-1960s the catch was used primarily to supply herring for reduction to meal and oil. The reduction fishery occurred on mixed aggregates of feeding herring during the summer months. The reduction fishery peaked during the 1920s and 1930s when annual harvests commonly exceeded 50,000 tons (Table 1). The reduction industry was phased out in the mid 1960s due a decline in the abundance of herring and to the development of the Peruvian anchovy reduction industry.

Southeast Alaska herring have historically supplied most of the bait for Alaska commercial longline and pot fisheries. This harvest occurs during the fall and winter months, a time when bait quality is best, on discrete wintering schools in major bays and inlets. All of the bait harvest is taken by purse seine gear. Relatively small quantities of herring have been harvested for fresh bait pounds. Existing regulations provide for a tray-pack bait fishery designed to produce a sport and commercial troll bait product; however, very little harvest has occurred for this purpose in recent years.

Currently, most of the annual herring harvest is taken in the spring sac roe fishery, which developed in the early 1970s. The sac roe fishery takes herring immediately prior to spawning when egg maturity is highest. A wild spawn-on-kelp fishery occurred during the 1960s; however, this fishery was phased out in 1969. A new herring spawn-on-kelp pound fishery was approved by the Alaska Board of Fisheries to begin in the spring of 1990 in Hoonah Sound. In 1992 the Alaska Board of Fisheries created a spawn-on-kelp fishery for the Craig/Klawock area and in 2003 created spawn-on-kelp fisheries in Ernest Sound and Tenakee Inlet.

Subsistence herring products have traditionally included spawn on kelp and herring spawn-on-hemlock branches. Commercial fishing regulations allow commercial fishers to harvest herring for their own bait.

The commercial utilization of Southeast Alaska herring resources has been historically controversial, and that remains true today. Although subsistence and personal use harvests constitute a minor portion of the total annual take, they are considered very important to the lifestyle and culture of local residents. Commercial harvesting is perceived by much of the public to have a large impact on the local availability of herring. Additionally, herring are important prey for many marine animals and healthy populations are generally viewed as necessary for ensuring healthy populations of predatory fish, such as salmon and halibut, and other marine life such as marine birds and several species of marine mammals.

## **MANAGEMENT STRATEGY**

The following management plan forms the regulatory basis for all Southeast Alaska commercial herring fisheries, and was formalized at the January 1994 Board of Fisheries meeting.

5 AAC 27.190. HERRING MANAGEMENT PLAN FOR SOUTHEASTERN ALASKA AREA. For the management of herring fisheries in the Southeastern Alaska Area, the Alaska Department of Fish and Game (ADF&G):

- (1) Shall identify stocks of herring on a spawning area basis;
- (2) Shall establish minimum spawning biomass thresholds below which fishing will not be allowed;
- (3) Shall assess the abundance of mature herring for each stock before allowing fishing to occur;
- (4) Except as provided elsewhere, may allow a harvest of herring at an exploitation rate between 10 percent and 20 percent of the estimated spawning biomass when that biomass is above the minimum threshold level;
- (5) May identify and consider sources of mortality in setting harvest guidelines;
- (6) By emergency order, may modify fishing periods to minimize incidental mortalities during commercial fisheries.

Section 16.05.940(16) defines a stock as “...a species, subspecies, geographic grouping or other category of fish manageable as a unit” and is here synonymous with spawning aggregate.

A “threshold level” is the minimum herring biomass needed to allow sustained yield and maintain biological productivity. Threshold levels have been established for each of the winter bait, sac roe, and spawn-on-kelp pound spawning aggregates. Threshold levels are based on all

available data and may be evaluated and revised over time. Current threshold levels vary from 1,000 to 25,000 tons for the major sac roe, winter bait, and spawn-on-kelp fisheries (Table 3).

Herring aggregates with a spawning biomass of less than 2,000 tons, of which there are many, are not considered for harvesting in either the Southeast Alaska winter bait or sac roe fisheries. Under the current approach for setting seasonal harvest limits, herring aggregates of 2,000 tons of adult fish would allow for an annual harvest of 200 tons of herring. The region's current management capability prevents successful management of the winter bait or sac roe fisheries for harvests of less than 200 tons. The exceptions are the Hoonah Sound spawn-on-kelp fishery and the Yakutat winter bait fishery (outside of Yakutat Bay, which is closed to commercial herring fishing), where the spawning thresholds are 1,000 tons.

Annual harvest limits are based on a graduated scale that allows for higher harvest rates as the forecasted mature herring population increases relative to the threshold level (Figure 2). The approach allows for an annual harvest rate of between 10% to 20% (for Sitka Sound 12–20%) when the forecasted spawning biomass is at or above established threshold levels. No commercial harvest is allowed if the forecasted spawning biomass is less than the threshold. For all areas, except Sitka Sound, when the forecasted spawning biomass is at the threshold level, a 10% harvest is allowed and the harvest rate increases 2% for each increase in spawning biomass of an amount equal to the threshold level. The harvest rate reaches a maximum of 20% when the stock is six times the threshold level. For Sitka Sound, when the spawning stock is forecasted to be at the threshold of 25,000 tons, the harvest rate is 12%, which increases by 8% with each increase in spawning biomass of an amount equal to the threshold level. This results in a maximum harvest rate of 20% when the forecasted spawning biomass is twice the threshold. A more rapidly increasing graduated harvest rate is used for Sitka Sound because the stock is substantially larger and generally considered to be more productive than other herring stocks in the region.

Historically, there have been two direct observation methods for estimating herring biomass in Southeast Alaska: (1) egg deposition dive surveys and (2) vessel hydroacoustic surveys. In cases where egg deposition surveys are used, the biomass estimate is based on data only from mature herring that spawned that season. Acoustic surveys have not been used to estimate biomass since the 1993/94 season, because the method is thought to be less reliable than egg deposition estimation. Beginning in 1994, ADF&G modified the primary method of forecasting herring abundance for major spawning aggregates in Southeast Alaska. Age Structured Analysis (ASA), which relies on a time series of herring population assessment data, was used to forecast herring biomass for those spawning aggregates with adequate historical data (Kah Shakes/Cat Island, Craig, Sitka Sound, Tenakee Inlet, and Seymour Canal). ASA uses estimates of recruitment, age, growth, maturation, natural mortality, weight-at-age, and spawning escapement to forecast herring abundance. Age and growth information is obtained by samples collected from test fishing, commercial harvests, mid-water trawling (department survey), and sampling on the spawning grounds by the department. Forecasts for herring in other areas are currently computed using a biomass accounting method where the observed spawning biomass and age composition from one year is modified by estimates of growth and mortality to produce a subsequent year's biomass forecast.

In the future, ASA-based forecasts may be applied to other areas as the time series of data for those areas becomes sufficient. ADF&G plans to use this tool in additional areas where there is regular, annual collection of relevant age composition and abundance data. The ASA method is

also used to forecast spawning biomass of herring in Southcentral Alaska, the Eastern Bering Sea, and British Columbia. Different forms of ASA models are also integral parts of the biomass assessment for most groundfish stocks in the Bering Sea and the Gulf of Alaska.

## **2013/14 SEASON SUMMARY**

The 2013/14 season commercial herring catch totaled approximately 23,345 tons of herring and herring equivalents (for spawn-on-kelp fisheries where mature herring are not harvested; Tables 1 and 2). The catch included 730 tons of winter bait herring and 19,778 tons of sac roe herring. The “equivalent” of 5,900 tons of herring was captured in spawn-on-kelp fisheries, based on an estimated ratio of 12.5 tons of herring per 1 ton of spawn-on-kelp product. Herring equivalents are estimates of herring mortality, immediate or delayed, resulting from handling during capture and impoundment. Although herring are released from pounds after spawn-on-kelp fisheries, for stock assessment purposes a mortality rate of 75% is assumed. Approximately 66 tons of bait herring were caught in a test fishery conducted in Sitka Sound.

Six sac roe herring fisheries are established by regulation. They include two exclusive purse seine areas (Sitka Sound and Lynn Canal) and two exclusive set gillnet areas (Kah Shakes/Cat Island and Seymour Canal). Regulations for the Hobart Bay/Port Houghton area provide for a herring gillnet fishery if the winter bait fishery does not harvest the entire guideline harvest level (Figure 4). West Behm Canal provides for a commercial sac roe fishery such that set gillnet and purse seine fisheries alternate fisheries (5 AAC 27.197). Both gear types are under a limited entry system. Sac roe fisheries opened in Sitka Sound and Seymour Canal in 2014. The Kah Shakes/Cat Island area has remained below threshold since the 1998/99 season. Lynn Canal was below threshold during the 2014 spawning season, and although survey results indicated that the spawning biomass was above the threshold in 2013, it has been below threshold in all other years since late 1970s.

Spawn-on-kelp fisheries were conducted in Craig, Ernest Sound, and Tenakee Inlet during 2014. The winter bait fisheries were also opened in Craig, Ernest Sound, and Tenakee Inlet.

## **2013/14 WINTER FOOD AND BAIT FISHERY**

Winter herring fishing for food and bait is allowed by regulation in Districts and/or Sections 1-10, 11-B, 11-C, 12, 13-A, 13-B (only south of the latitude of Aspid Cape), 14, 15-A, and 16 in Southeast Alaska. In the Yakutat area, Yakutat Bay is closed to herring fishing.

The fishing season is set by regulation from October 1 through February 28. In Southeast Alaska, regulations specify that open fishing periods be established by emergency order. Although the existing regulations specify purse seines and set gillnets as legal allowable gear, only purse seine gear has been fished in recent years.

Three areas were identified as having harvestable quantities of bait herring during the 2013/14 winter season (Figure 3): the Craig/Klawock area with a bait guideline harvest level (GHL) of 2,884 tons, the Ernest Sound area with a GHL of 966 tons, and the Tenakee Inlet area with a GHL of 501 tons. All three areas were open to the commercial harvest of herring on October 15, 2013, and closed by regulation February 28, 2014. A combined total of 827 tons of bait was harvested from these areas (Table 4). Harvest totals by area are confidential due to fewer than three participants in each area. The other bait area, Hobart/Houghton, was not opened during the 2013/14 season because the forecast of mature biomass was below threshold.

## **2013/14 TEST FISHERIES**

One test fishery was conducted in Southeast Alaska during the 2013/14 season. The test fishery was conducted in Sitka Sound, where 66 tons of winter bait was harvested. Herring were sampled from the catch to refine estimates of weight at age to incorporate into the Sitka Sound forecast for 2013/14. Test fishery revenues were used to defray costs for managing and assessing herring populations.

## **2013/14 SAC ROE FISHERY**

The sac roe harvest was comprised of a purse-seine catch of 16,957 from Sitka Sound, and a gillnet catch from Seymour Canal that is confidential due to fewer than three processors participating in that fishery (Table 5). Forecasted biomass was below minimum population threshold levels for all other sac roe areas, including Lynn Canal, Kah Shakes/Cat Island, and Hobart/Houghton, and no fisheries were allowed in these areas during the 2013/14 season.

The Sitka Sound 2014 mature biomass forecast resulted in a GHF of 16,333 tons. The Sitka Sound sac roe fishery went on two-hour notice effective 0800, March 20, 2014. A total of 16,957 tons was harvested during four openings (March 20, 23, 26, and 29 for a combined total elapsed time of 6 hrs 10 min). The average percentage of mature roe ranged from 12.1% to 12.8% among the four openings. There are 48 limited entry permits in this fishery; all permit holders were registered for the fishery, and all reported landing product.

The forecast of the 2014 mature biomass for Seymour Canal herring was 6,320 tons. The sliding scale harvest rate allowed for a 12.2% harvest rate for this biomass and a GHF of 772 tons for the 2013/14 fishing season. The Seymour Canal gillnet sac-roe fishery went on 2-hour notice effective 8:00 p.m., April 30, 2014. The fishery opened effective 3:00 p.m., April 30, and fishing activity ceased by 12:00 p.m. on May 4, 2014. A significant amount of the GHF was not harvested. Thirteen permit holders and one processor participated in the fishery. Due to confidentiality regulations, actual harvest amount cannot be made public.

## **2013/14 HERRING POUND FISHERIES**

There are three types of herring impoundment or “pound” fisheries in Southeast Alaska: tray pack bait, fresh bait, and spawn on kelp. The tray pack pound fishery was created in 1979 when the Board of Fisheries allocated a harvest of up to 100 tons. Fresh bait pounds have historically been allowed by regulation under a permit system in several areas (Figure 5). The conduct and management of the fresh bait and tray pack pound fisheries are essentially the same in that herring are impounded in net pens for a period of time to be sold as bait and both require a commissioner’s permit. During the 2003 Board of Fisheries meeting the two fisheries were combined under one management plan, 5 AAC 27.180 and 5 AAC 27.160(b). In recent years there has been relatively little participation in either of the fresh bait pound fisheries (Table 6).

There are four spawn-on-kelp pound fisheries in Southeast Alaska: Craig/Klawock and Ernest Sound in Southern Southeast permit area, and Hoonah Sound and Tenakee Inlet in Northern Southeast permit area (Figure 7). The spawn-on-kelp fishery for the Craig/Klawock area was initiated in the spring of 1992. The total GHF of herring is shared with the bait fishery with 60% allocated to the bait fishery and 40% (plus any remaining bait allocation) allocated to the spawn-on-kelp fishery. The 60:40% allocation split was new as of the 1997/98 season due to Board of Fisheries action (at the January 1997 meeting) that changed the previous allocation of 85% for bait

and 15% for spawn on kelp. For the 2013/14 season, the original spawn-on-kelp herring allocation (1,923 tons or 40% of the total GHLL) was increased by the amount remaining on the bait fishery allocation; however, it is confidential because there were fewer than three participants in the winter bait harvest, and the spawn-on-kelp GHLL was announced as “above 1,000 tons of herring,” which allowed for the maximum kelp allocation. There were a total of 75 pounds (27 single closed, 35 double closed, and 13 triple closed) on the grounds during the 2013/14 season. The total landings of spawn-on-kelp product are confidential due to participation of fewer than three processors (Table 7).

During its meeting in January 2003, the Board of Fisheries created two new herring spawn-on-kelp fisheries in Southeast Alaska: District 7 (Ernest Sound) and Section 12-A (Tenakee Inlet). The Ernest Sound fishery is considered part of the Southern Southeast spawn-on-kelp limited entry fishery, and Tenakee Inlet is considered part of the Northern Southeast spawn-on-kelp limited entry fishery. In Ernest Sound, the spawn-on-kelp fishery is allocated any remaining GHLL that is not harvested by the winter food and bait fishery or the bait pound fishery. During the 2013/14 season, the remaining GHLL for the Ernest Sound spawn-on-kelp fishery was above 700 tons, which provided for the maximum kelp allocation. The harvest from the winter bait fishery is confidential due to fewer than three participants in the fishery. The fishery was opened to purse seining of herring after 12:00 p.m. on April 1, 2014, until 12:00 p.m. on May 10, 2014. There were a total of 76 pounds (25 single closed and 51 double closed) on the grounds during the 2013/14 fishery. A total of 189 tons of spawn-on-kelp product was landed.

In Tenakee Inlet, the spawn-on-kelp fishery is allocated any remaining GHLL that is not harvested by the winter food and bait fishery or the bait pound fishery. During the 2013/14 season, the winter bait harvest was confidential and the remaining GHLL for the Tenakee Inlet spawn-on-kelp fishery was within the 300-499-ton range, which provided for the maximum kelp allocation. The fishery was opened to purse seining of herring after 12:00 p.m. on April 6, 2014, until 12:00 p.m. on May 15, 2014. There were a total of 33 pounds (2 single closed, 25 double closed, 5 triple closed, and 1 quadruple closed) on the grounds during the 2013/14 fishery. The total landings of spawn-on-kelp product are confidential due to participation of fewer than three processors (Table 7).

The Hoonah Sound spawn-on-kelp fishery was not opened during the 2013/14 season, as forecasted biomass was below threshold.

## **HERRING SPAWN-ON-KELP SUBSISTENCE FISHERY**

The harvest of “wild” herring spawn on kelp has occurred traditionally throughout the region. The Southeast Alaska fishery is regulated solely through the issuance of subsistence spawn-on-kelp permits at local ADF&G offices, whereas no permit is required for the Yakutat area. The permits specify times, areas, and amounts of spawn on kelp allowed. The annual possession limit for herring spawn-on-kelp is 32 pounds for an individual or 158 pounds for a household of two or more persons. Additional permits for herring spawn on kelp above the annual possession limit are allowed at the department’s discretion.

Subsistence spawn-on-kelp harvests generally occur in March and April near Craig, Hydaburg, and Sitka, where major herring spawning populations are found (Figure 6). *Macrocystis* kelp is the preferred species of kelp. In 2014, based on department permits, an estimated combined total of 7,909 pounds (Table 8) of wild spawn-on-kelp product was harvested in these areas.

## **HISTORICAL VALUE**

Exvessel value data for Southeast Alaska herring fisheries was obtained October 9, 2014, from the Commercial Fisheries Entry Commission's (CFEC) website at <http://www.cfec.state.ak.us/bit/mnuherr.htm> for 1977 through 2013. Data for 2014 from CFEC is not expected to be available until late 2015, and 2013 data is preliminary. Data is not inflation adjusted. Questions, definitions, and additional information concerning exvessel value may be directed to the above web site and CFEC, and it is reproduced here for convenience (Table 9). CFEC data is collected and recorded on a calendar-year basis. Consequently, winter bait fishery values represent an estimate of the values of the fishery, rather than from the actual fishery season, which crosses calendar years.

From 1995 (when all present fishery types became developed) through 2014, the combined total commercial exvessel values have ranged from a low of \$3,23,000 in 1998 to a high of \$21,002,000 in 2008. Generally, the largest percentage of the total value occurs in the seine sac-roe fishery. However, in 2014 the spawn-on-kelp fishery value exceeded that of the sac-roe fishery for the first time in the history of these fisheries (Table 9).

## **2014/15 SEASON OUTLOOK**

After a period of building since about the late 1990s, herring spawning biomass in Southeast Alaska has shown signs of decline over the past few years. The spawning biomass estimated in 2014 for Southeast Alaska is at a level similar to that of the late 1990s prior to the increase in herring biomass (Figure 8). The lower biomass in 2014 was observed in many spawning areas, suggesting a possible regionwide environmental effect on spawning or adult survival rate. Additionally, in 2014 the percentage of age-3 herring was very low for virtually all spawning areas, possibly indicating there was poor survival for the juvenile phase of this cohort across the region.

The degree of decline in herring biomass varies by spawning area. In some areas, such as Hoonah Sound, spawning biomass has declined dramatically, whereas in others, such as Craig, the decline appears to be much more gradual. However, regardless of the level of decline, commercial harvest opportunity will undoubtedly be reduced for the 2014/15 herring fishing seasons.

Areas currently forecasted to be above threshold for the 2014/15 season include Seymour Canal, Sitka Sound, and Craig. Areas that are forecasted to be below threshold for the 2014/15 season include Hoonah Sound, Ernest Sound, West Behm Canal, Tenakee Inlet, Hobart Bay/Port Houghton, and Lynn Canal. No commercial fisheries will be conducted in these areas.

Additionally, although spawn has been documented in the Revilla Channel area each year since the Kah Shakes/Cat Island fishery has been closed, the majority of the spawn has been observed in waters of the Annette Island Reserve, where the state has no jurisdiction. Commercial fisheries have been ongoing in Annette Island Reserve waters.

The winter food and bait herring fisheries opened in Southeast Alaska on October 5, 2014, only in the Craig/Klawock area with a preliminary GHL of 500 tons. The fishery was opened with a preliminary GHL because the final stock assessment was not completed prior to the fishery season opening date. The winter food and bait GHL for this area for the 2014/15 season is 1,358 tons, based on an allocation of 60% of the total GHL (5 AAC 27.185(c)). The remaining 40%,

plus any portion not harvested during the winter bait fishery, is allocated to the spawn-on-kelp fishery. The winter food and bait will not open for the 2014/15 season in Ernest Sound, Hobart Bay, or Tenakee Inlet because forecasted biomass was below threshold.

The only spawn-on-kelp fishery that will open during the 2014/15 season is in the Craig/Klawock area. The GHF will be 905 tons, plus any remaining GHF from the winter food and bait fishery. Spawn-on-kelp fisheries will not open in Hoonah Sound, Ernest Sound, or Tenakee Inlet because biomass was forecasted below threshold.

The 2014/15 preliminary forecast for Sitka Sound is 44,237 tons with a preliminary GHF of 8,712 tons for the seine sac-rope fishery. Samples to estimate mean weight will be collected from the winter test fishery in Sitka Sound to update the forecast.

The 2014/15 forecasts for the Seymour Canal and West Behm Canal gillnet sac-rope fisheries are below threshold and there will be no commercial herring fisheries during the 2014/15 season.

Although there are areas where quotas set in regulation will be available to the commercial bait pound fishery (Figure 5), there are several areas where the forecasted biomass is below threshold. Areas below threshold include Section 1-E (West Behm Canal), District 7 (Ernest Sound), District 12 (Tenakee Inlet), Section 13-C (Hoonah Sound), and Sections 11-A, 15-B, 15-C (Lynn Canal).

## **TABLES AND FIGURES**

Table 1.—Southeast Alaska herring harvests in tons, 1900/01 to 2013/14.

Season	Total harvest <sup>a,b</sup>						
1900/01	1,194	1929/30	78,749	1958/59	38,797	1987/88	16,152
1901/02	1,250	1930/31	70,855	1959/60	49,866	1988/89	16,191
1902/03	812	1931/32	44,857	1960/61	38,906	1989/90	8,194
1903/04	1,494	1932/33	49,786	1961/62	24,709	1990/91	6,034
1904/05	1,521	1933/34	61,588	1962/63	16,959	1991/92	9,975
1905–06	1,309	1934/35	66,842	1963/64	15,703	1992/93	12,253
1906/07	1,005	1935/36	58,155	1964/65	23,553	1993/94	7,514
1907/08	1,382	1936/37	36,713	1965/66	12,390	1994/95	5,104
1908/09	1,711	1937/38	50,334	1966/67	5,670	1995/96	9,854
1909/10	1,075	1938/39	22,356	1967/68	3,214	1996/97	14,729
1910/11	6,867	1939/40	20,028	1968/69	1,852	1997/98	10,590
1911/12	12,057	1940/41	3,137	1969/70	2,644	1998/99	12,903
1912/13	16,067	1941/42	6,230	1970/71	5,015	1999/00	6,451
1913/14	13,496	1942/43	3,691	1971/72	3,867	2000/01	14,706
1914/15	8,318	1943/44	6,235	1972/73	6,307	2001/02	13,671
1915/16	6,964	1944/45	16,801	1973/74	7,837	2002/03	11,950
1916/17	11,194	1945/46	24,126	1974/75	7,985	2003/04	17,015
1917/18	12,445	1946/47	37,564	1975/76	7,942	2004/05	18,410
1918/19	17,825	1947/48	41,829	1976/77	8,640	2005/06	14,287
1919/20	10,962	1948/49	16,125	1977/78	6,071	2006/07	16,014
1920/21	16,452	1949/50	14,279	1978/79	6,532	2007/08	21,520
1921/22	6,012	1950/51	13,411	1979/80	9,217	2008/09	22,308
1922/23	16,950	1951/52	10,652	1980/81	8,393	2009/10	24,779
1923/24	21,240	1952/53	16,020	1981/82	8,723	2010/11	23,805
1924/25	29,395	1953/54	12,435	1982/83	9,764	2011/12	17,407
1925/26	57,782	1954/55	6,446	1983/84	9,076	2012/13	8,922
1926/27	73,843	1955/56	11,368	1984/85	11,079	2013/14	23,345
1927/28	45,310	1956/57	22,819	1985/86	9,792	—	—
1928/29	53,007	1957/58	24,745	1986/87	8,369	—	—

<sup>a</sup> Harvests include the fresh bait pound harvest and test fishery harvests.

<sup>b</sup> Includes spawn-on-kelp harvests converted to herring equivalents at 12.5 to 1 ratio.

Table 2.—Southeast Alaska annual herring catch (tons) by fishery, 1960/61 through 2013/14 seasons. Dashes indicate years when no fishery took place.

Season	Reduction	Winter Bait	Spawn on Kelp <sup>a</sup>	Sac Roe	Test <sup>b</sup>	Bait Pound	Total <sup>b</sup>
1960/61	36,790	2,116	—	—	—	—	38,906
1961/62	22,869	1,840	—	—	—	—	24,709
1962/63	13,765	3,172	22	—	—	—	16,959
1963/64	13,539	2,064	100	—	—	—	15,703
1964/65	21,397	1,957	199	—	—	—	23,553
1965/66	10,062	2,094	234	—	—	—	12,390
1966/67	2,918	2,422	330	—	—	—	5,670
1967/68	—	3,025	189	—	—	—	3,214
1968/69	—	1,816	36	—	—	—	1,852
1969/70	—	2,644	—	—	—	—	2,644
1970/71	—	3,324	—	1,691	—	—	5,015
1971/72	—	2,045	—	1,822	—	—	3,867
1972/73	—	3,954	—	2,353	—	—	6,307
1973/74	—	5,856	—	1,981	—	—	7,837
1974/75	—	5,910	—	2,075	—	—	7,985
1975/76	—	5,688	—	2,254	—	—	7,942
1976/77	—	6,409	—	2,231	—	—	8,640
1977/78	—	4,042	—	2,029	—	—	6,071
1978/79	—	3,485	—	3,047	—	—	6,532
1979/80	—	2,717	—	6,500	—	—	9,217
1980/81	—	1,671	—	6,722	—	—	8,393
1981/82	—	1,530	—	7,193	—	—	8,723
1982/83	—	1,030	—	8,713	—	21	9,764
1983/84	—	620	—	8,411	—	45.2	9,076
1984/85	—	1,406	—	9,636	—	37	11,079
1985/86	—	2,442	—	7,319	—	31	9,792
1986/87	—	2,347	—	5,957	—	65	8,369
1987/88	—	4,016	—	11,246	—	17	15,279
1988/89	—	3,155	—	12,970	—	66	16,191
1989/90	—	3,843	12	4,163	—	38	8,194
1990/91	—	3,273	13.3	2,514	—	81	6,034
1991/92	—	2,719	48.8	6,614	—	32.3	9,975
1992/93	—	1,052	19.7	10,955	—	*	12,253
1993/94	—	879	49.2	5,884	136	0	7,514
1994/95	—	464	54.4	3,850	110	0	5,104

-continued-

Table 2.–Page 2 of 2.

Season	Reduction	Winter Bait	Spawn on Kelp <sup>a</sup>	Sac Roe	Test <sup>b</sup>	Bait Pound	Total <sup>b</sup>
1995/96	—	484	37.3	8,749	155	0	9,854
1996/97	—	727	88	12,726	176	0	14,729
1997/98	—	840	108.4	8,233	162	0	10,590
1998/99	—	1,033	108	10,348	172	0	12,903
1999/00	—	926	36	4,966	109	*	6,451
2000/01	—	775	92.2	12,654	124	0	14,706
2001/02	—	355	171.9	10,854	306	6.8	13,671
2002/03	—	*	263.4	8,570	87	0.6	11,950
2003/04	—	*	447.4	11,296	231	7.3	17,015
2004/05	—	553	392.2	12,515	440	*	18,410
2005/06	—	689	191.1	11,155	55	0	14,287
2006/07	—	576	203.9	12,790	99	0	16,014
2007/08	—	655	386.5	15,900	134	0	21,520
2008/09	—	804	438.5	15,963	60	0	22,308
2009/10	—	1,021	407.0	18,615	55	0	24,779
2010/11	—	670	263.7	19,778	60	0	23,805
2011/12	—	552	285.0	13,232	60	0	17,407
2012/13	—	*	202.0	6,337	60	0	8,922
2013/14	—	*	472.0	17,379	66	0	23,345

\* When number of permits is less than three, information is considered confidential.

<sup>a</sup> A spawn-on-kelp pound fishery was implemented in the spring of 1990; prior harvests were from the “wild” spawn-on-kelp fishery. Harvest is tons of spawn-on-kelp product.

<sup>b</sup> Includes spawn-on-kelp product converted to herring equivalents at 12.5 to 1 ratio; does not include confidential values.

Table 3.—Herring spawning threshold levels for major herring aggregates in Southeast Alaska and Yakutat.

Area	Threshold Level (tons)
Hoonah Sound	1,000
Yakutat Bay	1,000
Ernest Sound	2,500
Anita Bay	2,500
Port Camden	2,500
Hobart Bay/Port Houghton	2,000
Lisianski Inlet	2,500
Seymour Canal	3,000
Tenakee Inlet	3,000
Tongass Narrows and George and Carroll Inlets	3,500
Craig/Klawock	5,000
Kah Shakes and Cat Island	6,000
Lynn Canal	5,000
Sitka Sound	25,000
West Behm Canal	6,000
Other aggregates not included above	2,000

Table 4.—Southeast Alaska winter food and bait herring harvest in tons, by fishing area and season, 1982/83 through 2013/14.

Season	Craig / Klawock	Anita Bay	Ernest Sound	Hobart Bay / Houghton	Port Camden	Tenakee Inlet	Lisianski Inlet	Whale/ Necker Bay	Scow Bay	Slocum Arm	Total
1982/83	140	124	0	0	0	749	0	0	17	0	1,030
1983/84	0	0	0	0	42	619	0	0	0	0	661
1984/85	0	0	0	0	0	1,406	0	0	0	0	1,406
1985/86	302	0	0	0	0	2,040	0	0	0	0	2,342
1986/87	1,231	0	0	0	0	1,275	0	0	0	0	2,506
1987/88	2,014	0	0	0	0	1,577	280	0	0	257	4,128
1988/89	1,730	0	0	0	0	655	770	0	0	0	3,155
1989/90	3,221	0	0	0	0	595	27	0	0	0	3,843
1990/91	3,272	0	0	0	0	0	0	0	0	0	3,272
1991/92	2,295	0	0	0	0	0	353	0	0	0	2,648
1992/93	629	0	8	0	0	0	239	176	0	0	1,052
1993/94	636	0	0	140	0	0	0	103	0	0	879
1994/95	124	0	111	229	0	0	0	0	0	0	464
1995/96	34	0	220	230	0	0	0	0	0	0	264
1996/97	525	0	6	104.4	0	98	0	0	0	0	727
1997/98	254	0	0	0	0	586	0	0	0	0	840
1998/99	102	0	96	0	0	835	0	0	0	0	1,033
1999/00	*	0	0	432	0	494	0	0	0	0	926
2000/01	*	0	0	0	0	775	0	0	0	0	775
2001/02	*	0	0	0	0	355	0	0	0	0	355
2002/03	*	0	0	0	0	*	0	0	0	0	*
2003/04	*	0	*	0	0	*	0	0	0	0	*
2004/05	553	0	0	0	0	0	0	0	0	0	553
2005/06	689	0	0	0	0	0	0	0	0	0	689

-continued-

Table 4.–Page 2 of 2.

Season	Craig / Klawock	Anita Bay	Ernest Sound	Hobart Bay / Houghton	Port Camden	Tenakee Inlet	Lisianski Inlet	Whale/ Necker Bay	Scow Bay	Slocum Arm	Total
2006/07	576	0	0	0	0	0	0	0	0	0	576
2007/08	565	0	90	0	0	0	0	0	0	0	655
2008/09	143	0	*	0	0	*	0	0	0	0	804
2009/10	*	0	*	0	0	*	0	0	0	0	1,021
2010/11	*	0	*	0	0	0	0	0	0	0	670
2011/12	309	0	*	0	0	0	0	0	0	0	*
2012/13	*	0	*	0	0	0	0	0	0	0	539
2013/14	*	0	*	0	0	*	0	0	0	0	827

\* Data considered confidential with fewer than three permits.

Table 5.—Annual Southeast Alaska sac roe herring harvest by area, in tons, 1971 through 2013–14.

Season	Sitka Sound	Lynn Canal	Seymour Canal	Revillagigedo Channel	Other Areas	All Areas
1970/71	748	688	35	0	220 <sup>a</sup>	1,691
1971/72	602	524	495	0	201 <sup>b</sup>	1,822
1972/73	597	798	506	0	452 <sup>c</sup>	2,353
1973/74	681	396	904	0	0	1,981
1974/75	1,517	558	0	0	0	2,075
1975/76	800	630	195	426	203 <sup>d</sup>	2,254
1976/77	0	926	485	820	0	2,231
1977/78	175	954	729	171	0	2,029
1978/79	2,250	0	269	528	0	3,047
1979/80	4,385	975	0	1,140	0	6,500
1980/81	3,506	761	615	1,840	0	6,722
1981/82	4,363	551	0	2,279	0	7,193
1982/83	5,450	0	0	3,250	0	8,713
1983/84	5,830	0	518	2,182	0	8,411
1984/85	7,475	0	0	2,161	0	9,636
1985/86	5,443	0	339	1,537	0	7,319
1986/87	4,216	0	302	1,439	0	5,957
1987/88	9,575	0	586	1,087	0	11,246
1988/89	12,135	0	547	592	0	12,970
1989/90	3,804	0	359	0	0	4,163
1990/91	1,908	0	0	660	0	2,514
1991/92	5,368	0	0	1,246	0	6,614
1992/93	10,186	0	0	737	0	10,953
1993/94	4,758	0	382	749	0	5,884
1994/95	2,908	0	319	626	0	3,853
1995/96	8,144	0	0	605	0	8,749
1996/97	11,147	0	0	1,137	442 <sup>e</sup>	12,726
1997/98	6,705	0	586	616	351 <sup>e</sup>	8,233
1998/99	9,136	0	706	0	506 <sup>e</sup>	10,348
1999/00	4,813	0	389	0	0	4,966
2000/01	11,972	0	620	0	0	12,654
2001/02	9,789	0	1,066	0	0	10,854
2002/03	7,051	0	1,519	0	0	8,570
2003/04	10,492	0	804	0	0	11,296
2004/05	11,366	0	945	0	204 <sup>e</sup>	12,515
2005/06	9,967	0	1,187	0	0	11,155

-continued-

Table 5.–Page 2 of 2.

Season	Sitka Sound	Lynn Canal	Seymour Canal	Revillagigedo Channel	Other Areas	All Areas
2006/07	11,571	0	1,219	0	0	12,790
2007/08	14,386	0	1,208	0	306 <sup>e</sup>	15,900
2008/09	14,755	0	867	0	341 <sup>e</sup>	15,962
2009/10	17,602	0	710	0	302 <sup>e</sup>	18,615
2010/11	19,419	0	*	0	* <sup>f</sup>	*
2011/12	13,232	0	0	0	0	13,232
2012/13	5,688	0	649	0	0	6,337
2013/14	16,957	0	*	0	0	16,957

\* When number of permits is less than three, information is considered confidential.

<sup>a</sup> Washington Bay (76 tons), Lisianski Inlet (100 tons).

<sup>b</sup> Lisianski Inlet.

<sup>c</sup> Yakutat Bay (158 tons), Helm Bay (194 tons), and Lisianski Inlet (100 tons).

<sup>d</sup> Helm Bay (26 tons), Chaik Bay (40 tons), Pybus Bay (22 tons), Gambier Bay (8 tons), and Kasaan Bay (107 tons).

<sup>e</sup> Hobart Bay/Port Houghton commercial sac roe gillnet fishery harvest, not including test fishery harvest.

<sup>f</sup> West Behm Canal commercial sac roe gillnet fishery harvest

Table 6.—Fresh herring bait pound harvests in tons by area, 1982-83 through 2013-14. Dashes indicate years when no fishery took place.

Season	Scow Bay	Farragut Bay	Sitka Sound	Tee Harbor	Indian Cove	Lisianski Inlet	West Behm Canal	Total Harvest
1982/83	7	14	0 <sup>a</sup>	0	0	0	—	21
1983/84	0	10.2	35	0	0	0	—	45.2
1984/85	0	4.3	33	0	0	0	—	37.3
1985/86	0	5	26	0	0	0	—	31
1986/87	0	3	62	0	0	0	—	65
1987/88	0	0	17	0	0	0	—	17
1988/89	0	0	66	0	0	0 <sup>a</sup>	—	66
1989/90	0	0	38	0	0	0	—	38
1990/91	0	16	65	0	0	0	—	81
1991/92	0	15	17	0	0	0	—	32
1992/93	0	0	*	0	0	0	—	*
1993/94	0	0	*	0	0	0	—	*
1994/95	0	0	0	0	0	0	—	0
1995/96	0	0	0	0	0	0	—	0
1996/97	0	0	0	0	0	0	—	0
1997/98	0	0	0	0	0	0	—	0
1998/99	0	0	0	0	0	0	—	0
1999/00	0	0	*	0	0	0	—	*
2000/01	0	0	0	0	0	0	—	0
2001/02	0	0	6.8	0	0	0	—	6.8
2002/03	0	0	*	0	0	0	0.6	0.6
2003/04	0	0	7.3	0	0	0	0	7.3
2004/05	0	0	*	0	0	0	0	*
2005/06	0	0	0	0	0	0	0	0
2006/07	0	0	0	0	0	0	0	0
2007/08	0	0	0	0	0	0	0	0
2008/09	0	0	0	0	0	0	0	0
2009/10	0	0	0	0	0	0	0	0
2010/11	0	0	0	0	0	0	0	0
2011/12	0	0	0	0	0	0	0	0
2012/13	0	0	0	0	0	0	0	0
2013/14	0	0	0	0	0	0	0	0

\* When number of permits is less than three, information is confidential.

<sup>a</sup> Pounds were allowed by regulation in Sitka Sound in 1983 and in Lisianski Inlet in 1989.

Table 7.—Herring spawn-on-kelp (SOK) pound fishery in tons of SOK product, 1989-90 through 2013-14. Dashes indicate years when no fishery took place. Asterisks signify confidential values.

Season	Craig / Klawock	Hoonah Sound	Ernest Sound	Tenakee Inlet	Total
1989/90	—	11.9	—	—	11.9
1990/91	—	13.2	—	—	13.2
1991/92	25.7	23.1	—	—	48.8
1992/93	5.7	14	—	—	19.7
1993/94	16.5	32.7	—	—	49.2
1994/95	25.4	29	—	—	54.4
1995/96	37.2	0	—	—	37.2
1996/97	23	65	—	—	88
1997/98	22.4	86	—	—	108.4
1998/99	36	71.6	—	—	107.6
1999/00	0.0 <sup>a</sup>	35.7	—	—	35.7
2000/01	27.2	66.2	—	—	93.4
2001/02	41.7	136.6	—	—	178.3
2002/03	69.2	146.6	No Quota	47.6	263.4
2003/04	49.3	243.3	56.1	98.7	447.4
2004/05	115.2	183.3	No Quota	93.7	392.2
2005/06	29	162.1	No Quota	No Quota	191.1
2006/07	44.5	159.4	No Quota	No Quota	203.9
2007/08	148.5	228.1	9.8	No Quota	386.5
2008/09	137.3	234.7	2.5	64.1	438.5
2009/10	116.7	290.4	No Quota	No Quota	407.0
2010/11	70.0	193.7	No Quota	No Quota	263.7
2011/12	98.0	187.0	No Quota	No Quota	285.0
2012/13	138.0	0.0	65.0	No Quota	203.0
2013/14	*	No Quota	*	*	472.0

<sup>a</sup> Craig/Klawock 2000-pound GHLL was 280 tons of herring. Estimated Craig spawning biomass was 9,591 tons. No product was landed.

Table 8.—Herring spawn-on-kelp subsistence estimated harvest (lb), 1965 through 2014. Dashes indicate years when no fishery took place.

Year	CRAIG-KLAWOCK-HYDABURG Permits			SITKA Permits			KAH SHAKES Permits			Other Permits		
	Issued	Returned	Estimated Harvest <sup>a</sup>	Issued	Returned	Estimated Harvest <sup>a</sup>	Issued	Returned	Estimated Harvest <sup>*</sup>	Issued	Returned	Estimated Harvest <sup>a</sup>
1967	201	130	3,368	—	—	—	—	—	—	—	—	—
1968	130	95	2,260	—	—	—	—	—	—	—	—	—
1969	80	61	2,858	—	—	—	—	—	—	—	—	—
1966	145	86	5,200	—	—	—	—	—	—	—	—	—
1970	103	60	3,213	—	—	—	—	—	—	—	—	—
1971	81	66	2,643	—	—	—	—	—	—	—	—	—
1972	102	44	4,250	—	—	—	—	—	—	—	—	—
1973	31	9	1,209	—	—	—	—	—	—	—	—	—
1974	159	39	3,087	—	—	—	—	—	—	—	—	—
1975	92	34	1,640	—	—	—	—	—	—	—	—	—
1976	54	12	1,728	—	—	—	—	—	—	—	—	—
1977	34	7	352	—	—	—	—	—	—	—	—	—
1978	109	83	3,521	—	—	—	11	8	122	—	—	—
1979	102	81	1,268	21	10	137	16	6	0	—	—	—
1980	309	189	3,721	19	13	145	33	24	75	—	—	—
1981	157	87	6,148	26	19	192	6	5	12	—	—	—
1982	187	81	5,485	36	25	886	30	18	342	—	—	—
1983	302	189	5,945	69	48	1,991	33	24	103	—	—	—
1984	261	159	4,972	50	40	1,281	14	6	116	—	—	—
1985	233	168	9,553	71	45	3,963	19	10	0	—	—	—
1986	241	142	5,565	90	82	3,929	5	2	0	—	—	—
1987	263	158	15,038	97	59	8,827	5	4	0	—	—	—
1988	191	124	6,354	127	77	6,146	6	6	68	—	—	—
1989	221	117	11,699	70	53	962	10	9	0	—	—	—
1990	245	172	10,158	71	63	4,022	7	0	0	—	—	—

-continued-

Table 8.–Page 2 of 2.

Year	CRAIG-KLAWOCK-HYDABURG			SITKA			KAH SHAKES			Other		
	Permits			Permits			Permits			Permits		
	Issued	Returned	Estimated Harvest <sup>a</sup>	Issued	Returned	Estimated Harvest <sup>a</sup>	Issued	Returned	Estimated Harvest <sup>*</sup>	Issued	Returned	Estimated Harvest <sup>a</sup>
1991	274	142	12,627	75	61	5,925	4	4	60	—	—	—
1992	407	304	16,677	118	90	7,151	8	7	75	—	—	—
1993	290	167	5,592	61	47	5,307	8	3	0	—	—	—
1994	293	161	5,376	81	63	3,078	9	6	0	—	—	—
1995	201	80	3,446	57	46	2,182	3	1	0	—	—	—
1996	261	164	11,443	100	76	6,000	4	3	0	—	—	—
1997	226	166	8,247	87	60	4,837	0	0	0	—	—	—
1998	213	88	5,670	60	42	3,079	0	0	0	—	—	—
1999	185	120	6,420	58	39	3,746	1	1	40	—	—	—
2000	116	77	820	47	46	2,759	0	0	0	—	—	—
2001	118	50	7,054	52	46	910	0	0	0	—	—	—
2002	111	35	7,164	47	41	4,111	1	0	0	—	—	—
2003	144	100	9,698	40	32	3,139	2	1	0	2 <sup>b</sup>	1	0
2004	95	57	5,685	52	36	10,412	6	5	0	7 <sup>b</sup>	6	0
2005	140	90	9,770	41	28	2,196	3	3	0	1 <sup>b</sup>	1	0
2006	92	82	6,074	32	31	3,399	0	0	0	0	0	0
2007	109	81	3,505	42	37	2,403	0	0	0	0	0	0
2008	117	57	7,043	41	39	1,741	0	0	0	0	0	0
2009	131	63	10,584	67	59	4,080	0	0	0	0	0	0
2010	102	51	7,288	60	55	5,784	0	0	0	0	0	0
2011	125	70	10,395	55	45	3,377	0	0	0	0	0	0
2012	85	67	3,663	61	50	2,532	0	0	0	1 <sup>b</sup>	1	0
2013	126	99	5,429	37	36	2,251	0	0	0	0	0	0
2014	116	76	5,057	42	29	2,842	0	0	0	2 <sup>b</sup>	2	10

<sup>a</sup> Total harvest extrapolated from harvests reported on returned permits to include an estimate of unreported harvests.

<sup>b</sup> West Behm Canal.

Table 9.—Southeast Alaska commercial herring fisheries total gross earnings (in thousands), 1977 through 2013, by calendar year. All values obtained from CFEC. Dashes indicate years when no fishery took place.

Year	Winter Bait	Seine Sac Roe	Gillnet Sac Roe	SOK – Southern	SOK – Northern	Total <sup>c</sup>
1977	\$507	\$695	—	—	—	\$1,202
1978	—	\$1,422	—	—	—	\$1,422
1979	—	\$9,052	—	—	—	\$9,052
1980	—	\$2,132	\$312	—	—	\$2,444
1981	\$343	\$2,376	\$1,246	—	—	\$3,965
1982	\$558	\$1,663	\$602	—	—	\$2,823
1983	\$166	\$5,032	\$2,949	—	—	\$8,147
1984	\$128	\$3,729	\$2,327	—	—	\$6,184
1985	\$321	\$7,883	\$3,186	—	—	\$11,390
1986	\$548	\$7,413	\$2,636	—	—	\$10,597
1987	\$586	\$4,396	\$2,547	—	—	\$7,529
1988	\$1,010	\$4,169	\$3,108	—	—	\$8,287
1989	\$900	\$1,182	\$1,379	—	—	\$3,461
1990	\$1,030	\$1,950	\$260	—	\$199	\$3,439
1991	\$916	\$206	\$624	—	\$226	\$1,972
1992	\$720	\$1,373	\$1,777	—	\$529	\$4,399
1993	\$471	\$3,484	\$1,300	—	\$417	\$5,672
1994	\$125	\$3,626	\$1,768	—	\$1,823	\$7,342
1995	\$147	\$3,933	\$1,864	\$999	\$1,476	\$8,419
1996		\$14,350	\$1,665	\$1,328	Confidential	\$17,343
1997	\$175	\$4,726	\$990	\$282	\$1,082	\$7,255
1998	\$526	\$1,646	\$613	\$69	\$169	\$3,023
1999	\$397	\$4,906	\$713	\$374	\$1,244	\$7,634
2000	\$236	\$2,667	\$226	—	\$596	\$3,725
2001	\$131	\$5,794	\$254	\$342	\$1,017	\$7,538
2002	\$110	\$4,441	\$614	\$352	\$1,733	\$7,250
2003	Confidential	\$3,201	\$784	\$759	\$2,288	\$7,032
2004	Confidential	\$5,162	\$497	\$653	\$2,880	\$9,192
2005	Confidential	\$6,118	\$408	\$625	\$1,566	\$8,717
2006	Confidential	\$2,645	\$389	\$289	\$2,013	\$5,336
2007	Confidential	\$5,693	\$570	\$1,090	\$4,491	\$11,844
2008	\$232	\$10,732	\$1,426	\$3,493	\$5,119	\$21,002
2009	Confidential	\$12,678	\$1,064	\$1,277	\$2,890	\$17,909
2010	Confidential	\$12,146	\$546	\$756	\$2,256	\$15,704
2011	Confidential	\$3,961	\$64	\$718	\$1,814	\$6,557
2012	Confidential	\$8,865	\$0	\$2,013	\$4,089	\$14,967
2013 <sup>a</sup>	Confidential	\$4,436	\$441	\$4,924	\$0	\$9,801
2014 <sup>b</sup>	Confidential	\$3,145	Confidential	Confidential	Confidential	\$9,417
Recent 10-year (2004–2013) Average						
	\$232	\$7,042	\$545	\$1,687	\$2,693	\$12,125
Recent 5-year (2009–2013) Average						
	—	\$6,511	\$263	\$2,103	\$2,040	\$11,289

<sup>a</sup> Preliminary data from Commercial Fisheries Entry Commission (CFEC).

<sup>b</sup> Preliminary ADF&G estimates based on fish tickets.

<sup>c</sup> Confidential data not included in totals, except for 2014.

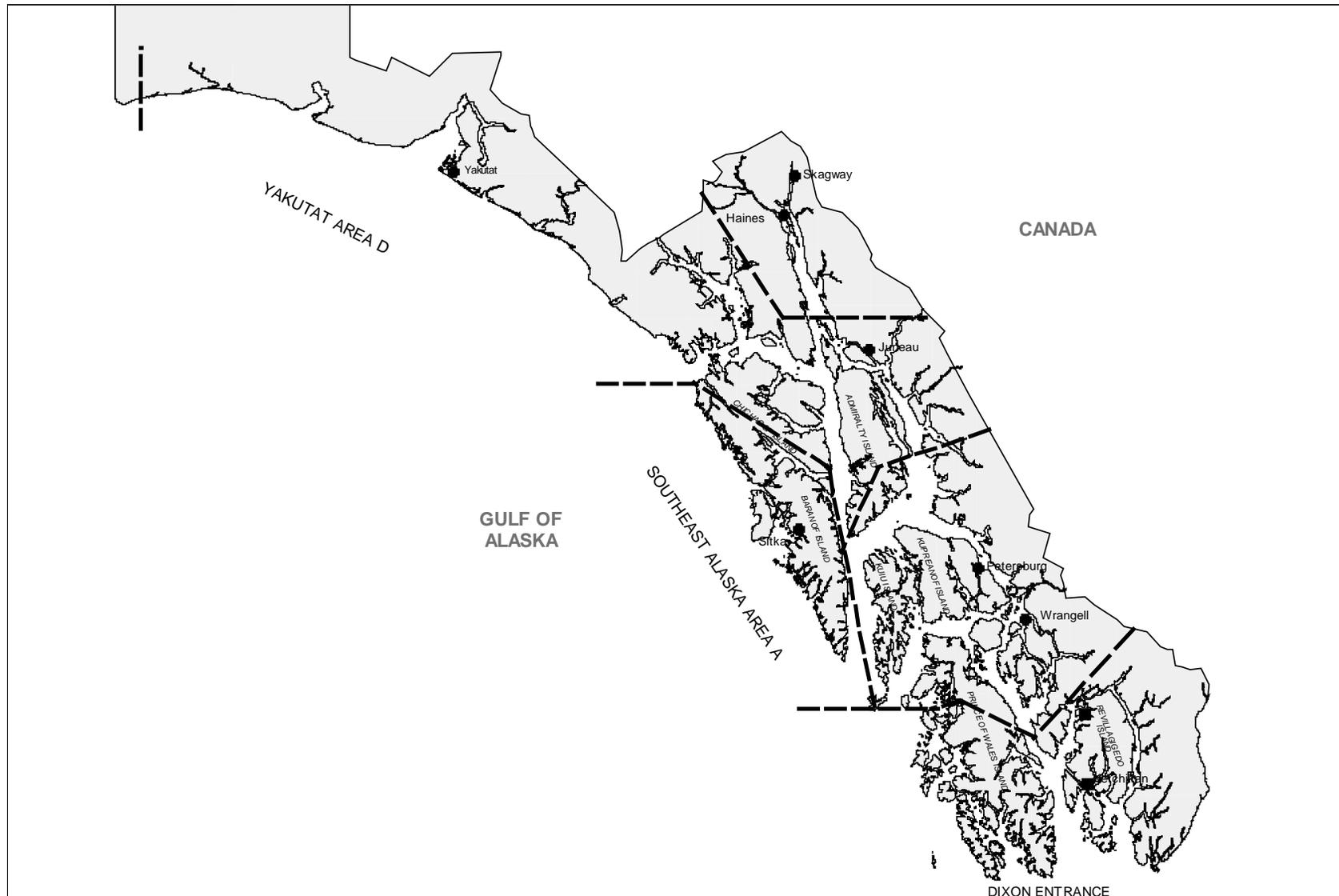


Figure 1.—Southeast Alaska Region (Region 1) herring registration areas (Southeast Alaska Area A and Yakutat Area D) and management area boundaries.

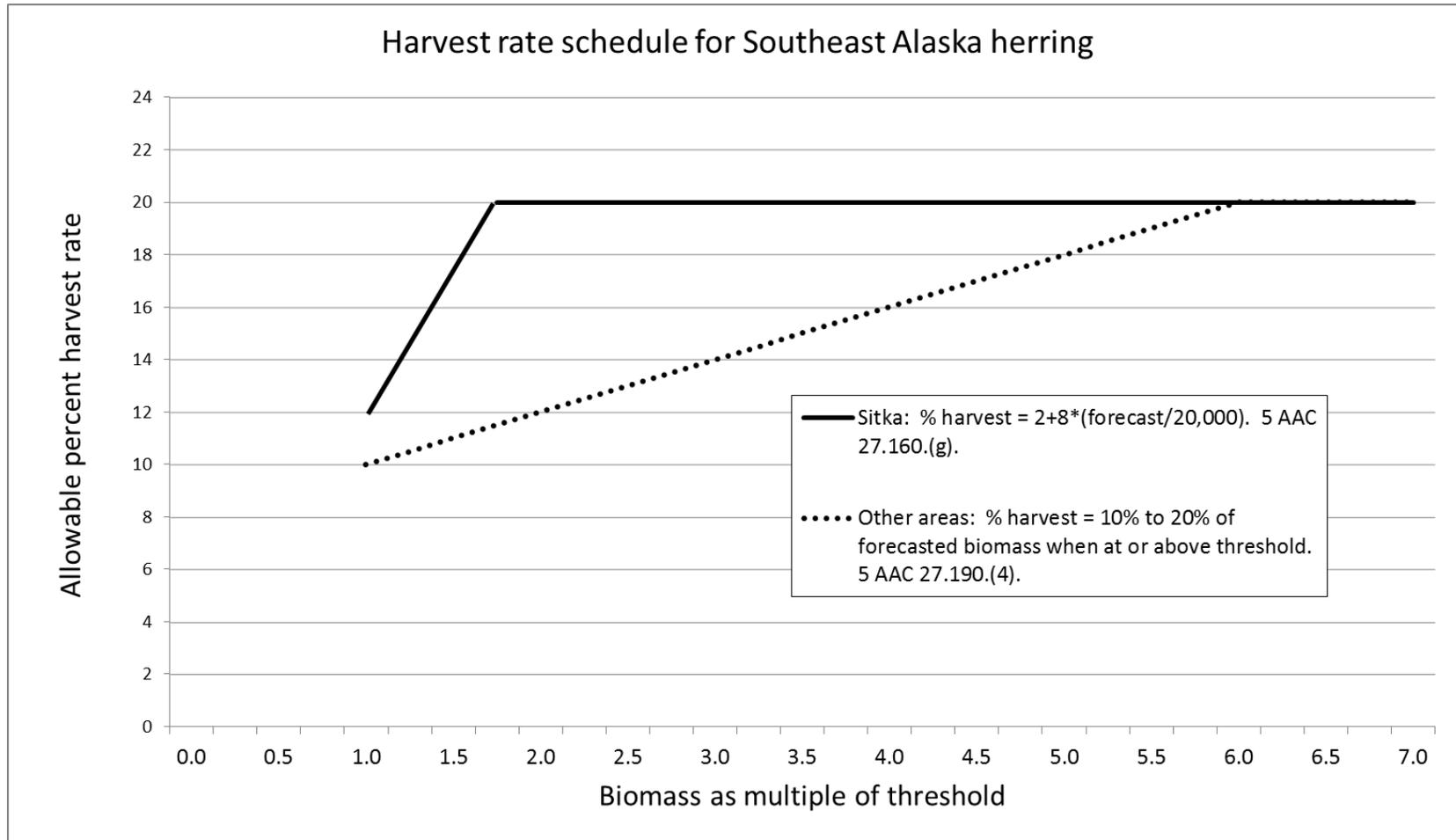


Figure 2.—Generalized harvest strategy for Southeast Alaska and Yakutat herring showing allowable percent annual exploitation rate as related to estimated biomass of mature herring, expressed as a multiple of the threshold level. No fishery occurs if below threshold and the maximum harvest rate is 20%.

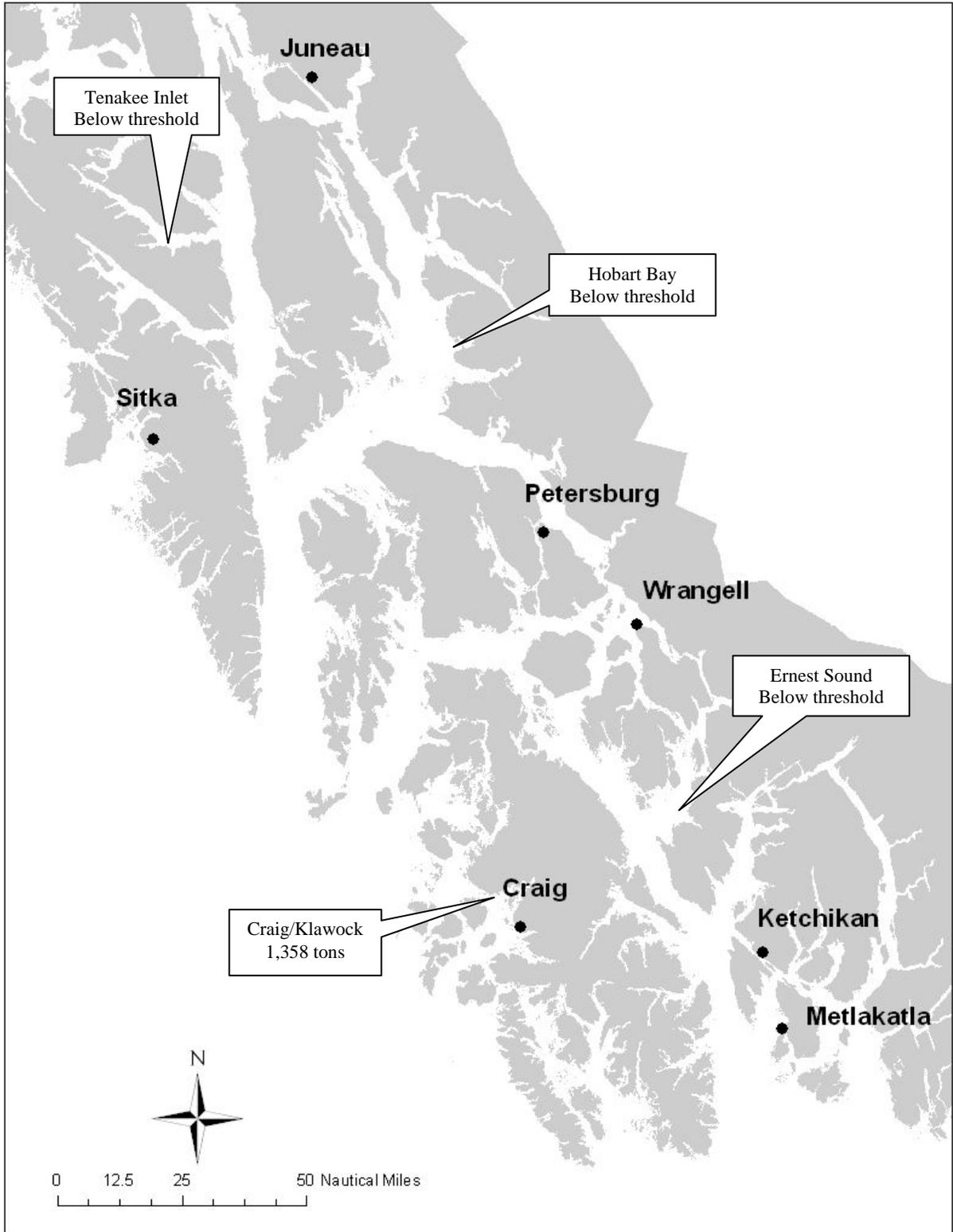


Figure 3.—Food and bait fishing areas and guideline harvest levels, 2014/15 season.

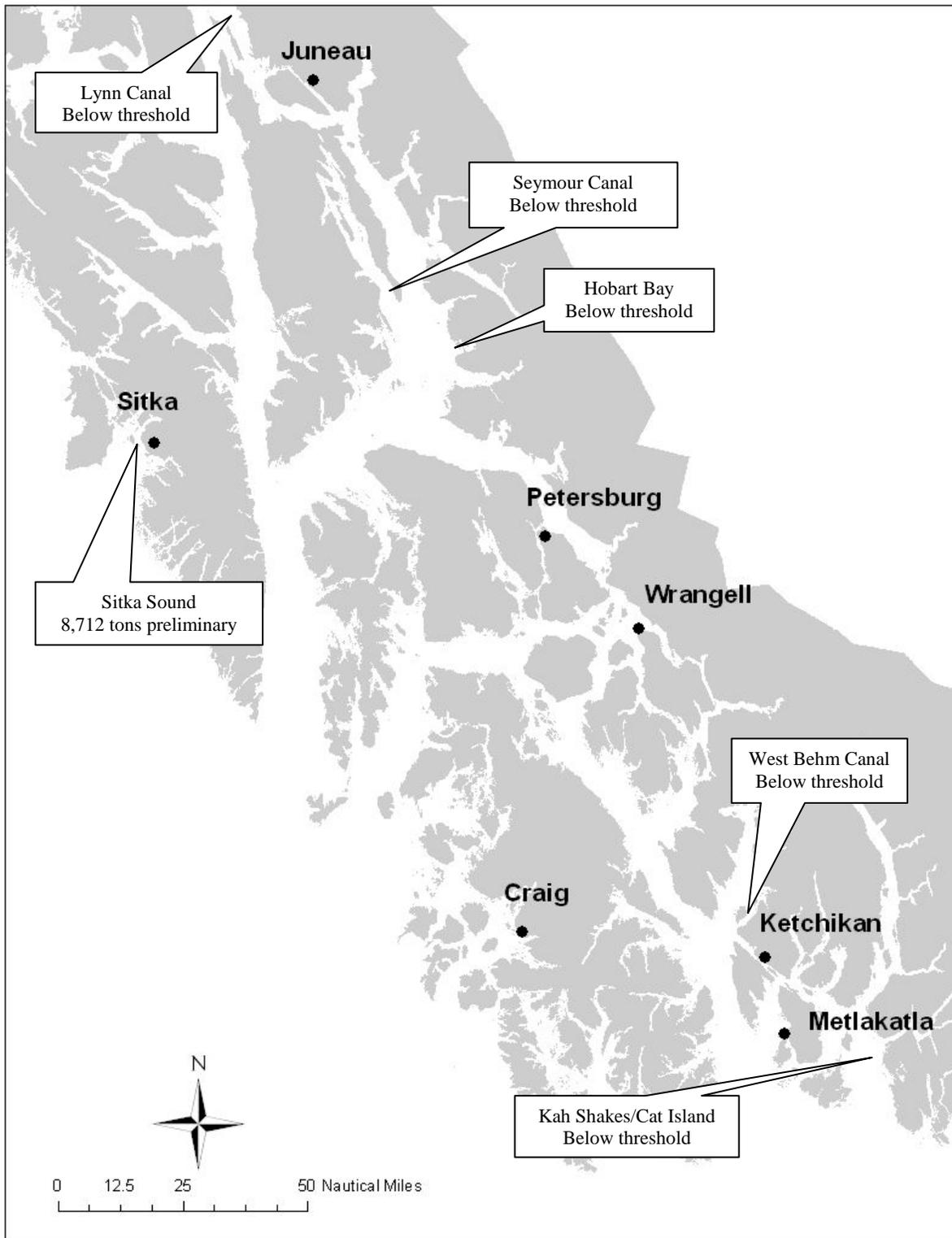


Figure 4.–Sac-roë fishing areas and guideline harvest levels, 2014/15 season.

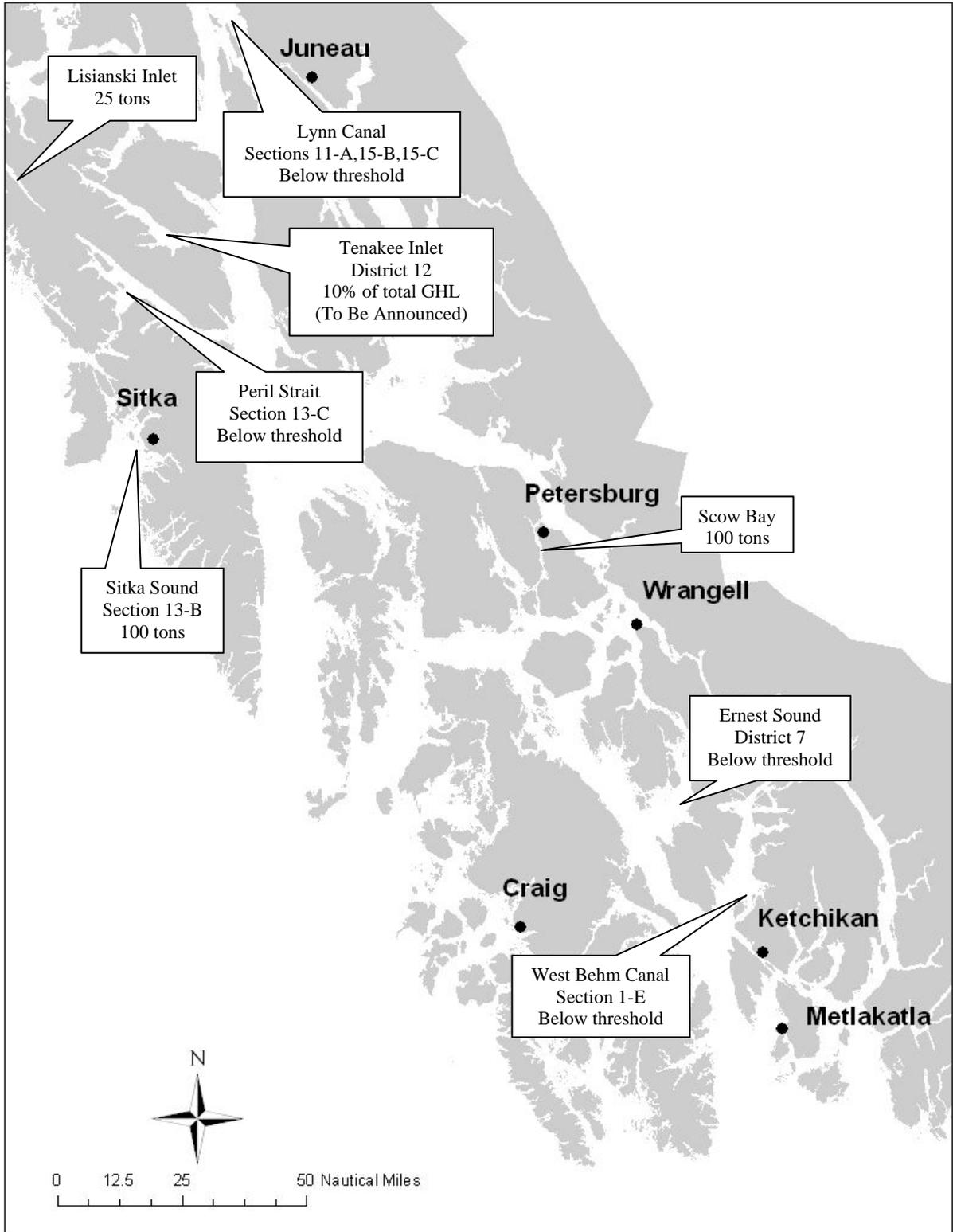


Figure 5.—Fresh bait pound fishing areas and GHGs for the 2014/15 season.

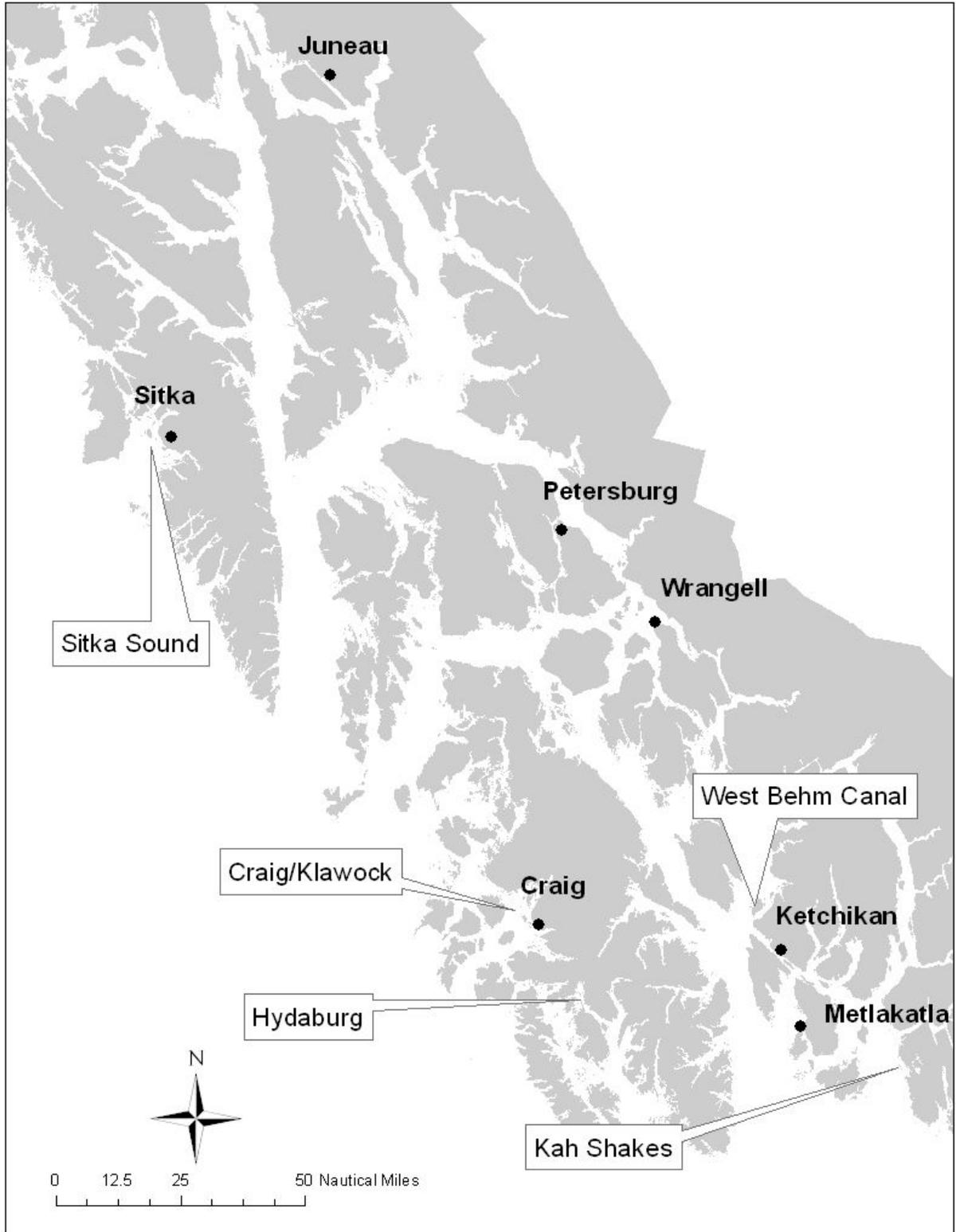


Figure 6.–Major Southeast Alaska spawn-on-kelp subsistence fishery areas.

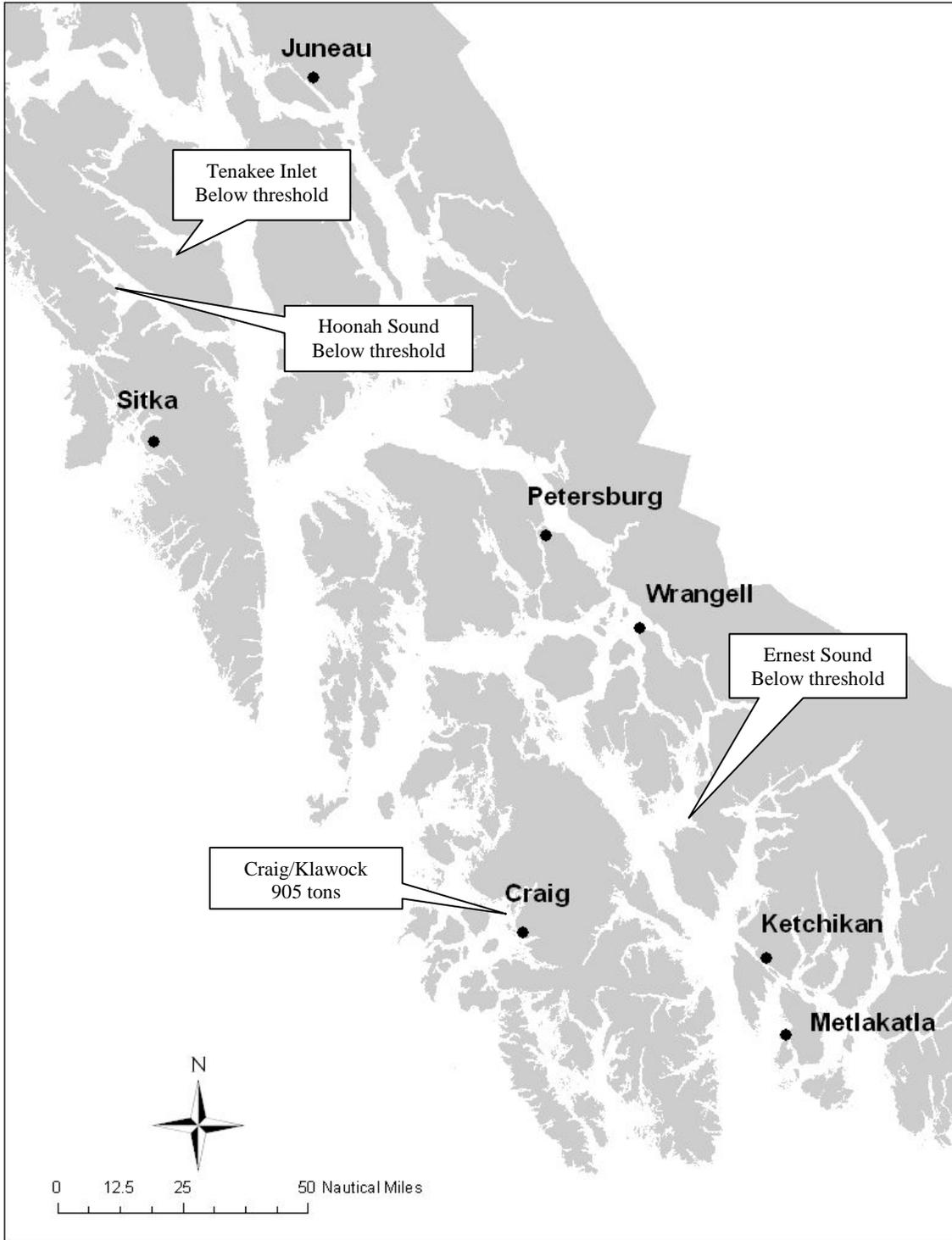


Figure 7.—Spawn-on-kelp fishing areas and guideline harvest levels (tons of herring), 2014/15 season.

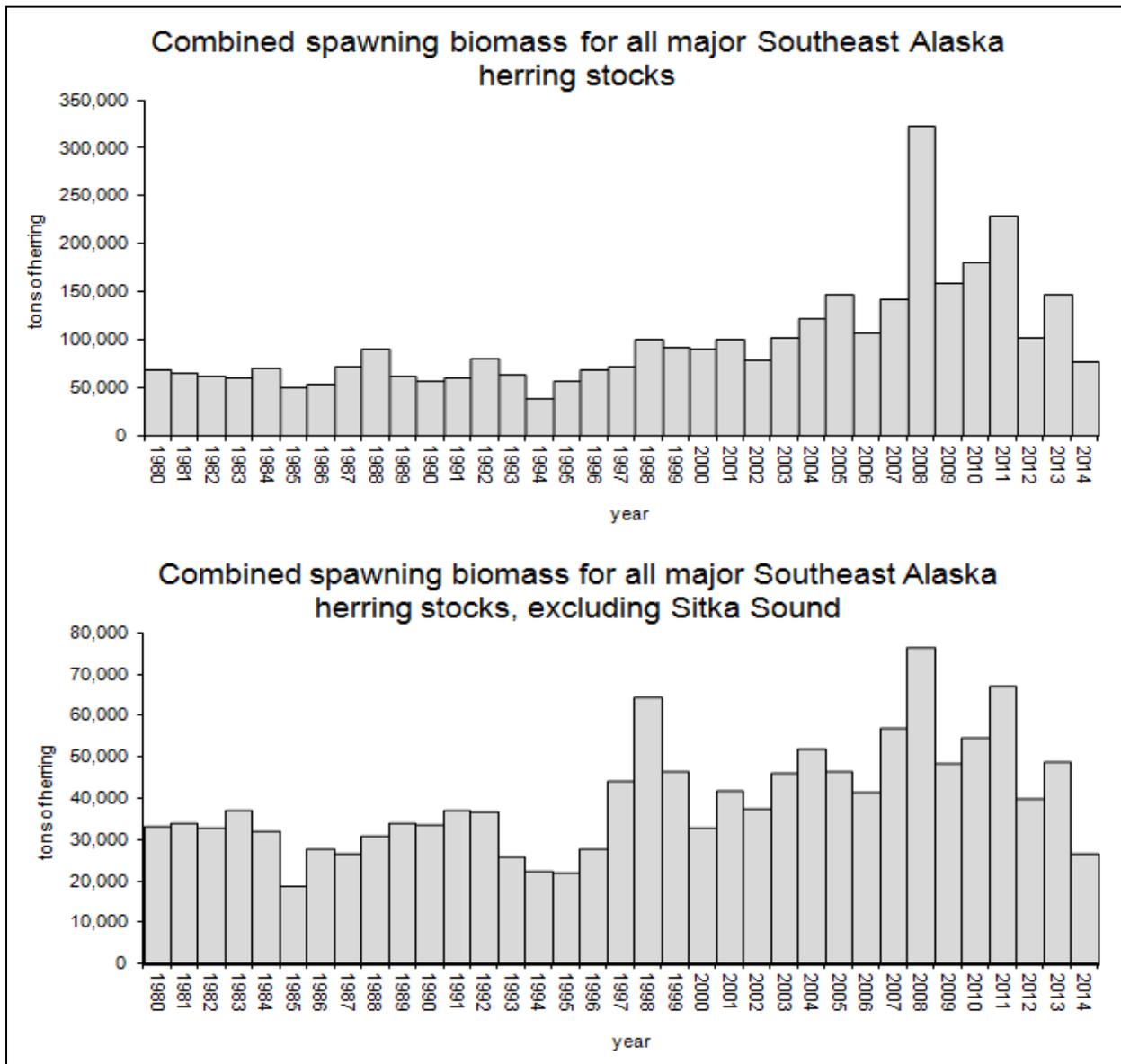


Figure 8.—Estimates of aggregated spawning biomass for all spawning areas in Southeast Alaska (top graph) and all areas except Sitka Sound (bottom graph). Estimates were calculated using spawn deposition methods for comparability and are not model-based.